RUMBA Monitoring II

Monitoring of the measures for sustainable construction sites implemented in the housing project Thürnlhof (East and West) in Vienna, final results

Additional housing research project complementing the EU-LIFE-Project RUMBA – Guidelines for Sustainable Construction Site Management

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Abstract

With the completion of the last housing units in summer 2008 on Thürnlhof West Europe´s most sustainable construction site has been accomplished. The forecast on the final results during the first phase is now replaced by final facts: 66 % less kilometres and 37 % less rides of heavy load vehicles for the site.

For the reason of completeness the first preliminary report has been corrected and integrated in the final report. The validation of result requires a return to the beginning of RUMBA: A rough analysis of logistics patterns of comparable construction sites approves the effectivity of logistics management. The monitoring report offers a view on the results in detail and a framework for benchmarking in construction logistics. Beyond the analysis of the pilot project, the objective is to develop a system of evaluation for construction logistics on a larger scale: From planning a sustainable site to sustainable urban development logistics e.g. the new central station and the airfield Aspern, with 240 ha Europe´s biggest urban development area.

Environmental impact of construction sites

Building stimulates the industry, ensures our prosperity and our quality of life. But construction activities also cause a lot of noise, waste, dust and other air pollution that put a strain on us and on our environment. Research has found out that

- Building logistics are not following patterns of the shortest distance transportation
- Building one flat provokes about 60 truck rides with about 2500 to 3000 kilometres travelled. In Vienna each year an average of 5000 flats is being erected, thus causing about 15 million kilometres of heavy load vehicle traffic.
- In Vienna construction site traffic sums up to only 1 % of the total traffic but causes 10 % of the traffic-induced pollution due to the high percentage of heavy load and old vehicles.

- Without counteractive measures construction sites emit a lot of dust, especially dangerous particulate matter.
- Only a small proportion of construction site waste is being sorted and recycled. On conventional construction sites 75-80 % of the waste (not including excavated earth) is mixed waste.

The City of Vienna is aiming to keep the environmental impact of building processes as low as possible. For that purpose the project RUMBA - Guidelines for Sustainable Construction Site Management was started in 2001, supported by the EU-Life environment programme. RUMBA wants to improve the framework for environment-friendly construction site management under market conditions. This framework includes legislation, standards, guidelines and regulations, calls for tender, contracts, subsidies, issues pertaining to the location of building logistics centres as well as questions of efficiency, costs, technology and organisation. The demonstration projects conducted by the project partners succeeded to provide practical experience and proof of feasibility.

The environmental friendliest construction site of Europe: RUMBA demonstrative project Thürnlhof

In 2004 the City of Vienna held a competition for housing developers as part of RUMBA. The winners will erect about 900 flats on eight building sites at Thürnlhof in Vienna-Simmering until 2008. The aim is to reduce heavy load vehicle traffic, to cut down the amount of kilometres driven compared to normal construction sites and to use mostly modern low-emission vehicles (at least EURO III standard). Furthermore dust emissions caused by construction sites shall be minimised. Another focus is on pre-sorting building materials directly on the building site.

To achieve these aims the following actions have been taken at Thürnlhof:

- A collective logistics management for the building sites of all developers;
- Registration and control of all heavy load traffic, cargo, distances, routes etc. to and from the construction site to record the total pollution effects of a construction site;
- Fees for heavy load traffic going further than 10 or 15 km in the first phase;
- Fees for heavy load trucks below EURO III standard;
- Creating a waste separation point for residual building materials at the construction site;
- Interim storage of excavated earth on building sites not yet in use, re-use for land-modelling or other construction sites nearby;
- Reduction of excavation in one case, due to lifting up the basement;
- Reduction of dust emission by cleaning or asphalting roads on the construction site and watering bulk cargo and the slopes of the excavation pit.

Learning from Thürnlhof: Monitoring and feasibility evaluation of the field-tested measures

The monitoring, funded by the Vienna Housing Research, assigned volume and type of deliveries to the different building projects at Thürnlhof. The logistics data will be checked and analysed monthly. The collected data represents benchmarks for construction logistics of housing in Vienna:

- 7 km/m^2 (GFA) or 850 km/flat
- 0,3 ride/m^2 (GFA) or 38 rides/flat

The feasibility evaluation will be based on these conclusions. Environmental impact, technical feasibility, costs and the transferability into the regulatory framework of housing will be evaluated.

Final results of the monitoring

The environmental results are very promising:

The kilometres travelled by heavy load trucks have been reduced by 66 %, compared to a conventional housing project evaluated in 1994. The total number of rides has been reduced by 37 %. The reduction of kilometers is accompanied by a JIT-timetable management on logistics for the site. That means a reduction of pollutants, noise and street abrasion of more than 70 %. Taking into consideration the high percentage of EURO III-Standard vehicles used at Thürnlhof the reduction of environmental pollution compared to conventional construction sites is probably more than 80 %.

Up to 30 % of building costs are influenced by logistics; not just transportation but also the handling, area management, storage, anti-theft protection and reduction of construction time are included issues. The costs for the environment and logistics management amount to less than 1 % of the total costs.